Memorandum
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Subject
Scientific evaluation of published paper by Brizzi and Marinelli.

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Direct dialling
[redacted]

Introduction

During the discussions regarding concerns about negative health issues that could possibly be caused by the planned SMART-L radar system in Herwijnen, the people organized to protest against the build of this radar put the paper by Brizzi and Marinelli [1] as a "shocking signal" to the attention of the Dutch Parliament and consequently the public. Due to the fact that the journal[1] discontinued existence a hard copy of this paper was hard to obtain. For the sake of readability of this memorandum this paper is included in hard-copy as an attachment.
This memorandum aims to capture a scientific analysis of the paper. It is noted that the SMART-L radar differs from the ARGOS 10 radar in various technical aspects.

Objective of this memorandum

This memorandum presents the results of an analysis on the scientific quality and discusses the scientific relevance of this paper regarding the discussions pertaining to the planned SMART-L in Herwijnen.

Scientific quality of the paper

This memorandum only judges the scientific quality of the paper. The research might have been conducted appropriately but I am unable to acknowledge this since crucial information is missing in the paper. Therefore, I assume the research is executed as is written down which would be logical to take as starting point.

The paper lacks important information, such as

- Demographic information, the so-called "Table 1", pertaining to the subjects, such as life-time at the address, gender, age-distribution, profession, smoker/non-smoker.
- Exposure information.
  The paper does not elucidate on the RF-levels pertaining to the four

[1] The (scientific) impact factor of this journal is 0.07, which is low. At September 24th 2020 it is noticed that Eur. J. Oncol. discontinued.

exposure categories. The paper states that measurements have been carried out, but information on the exposure levels (peak- and time-averaged field strengths) is missing.

- Which statistical test has been used, as well as the pertaining power-calculations, are not mentioned in the paper.
- No discussion is provided why the authors have chosen the five types of deceases, namely cancer, heart attacks and strokes, miscarriages, congenital malformations and severe behavioural disorders.
  From a scientific point of view it is important to elucidate on this choice in a scientific paper. For example: did they aim to study a possible biological mechanism? If so, this should have been discussed.

The paper reveals serious methodological errors. The major ones are:

- The results are presented without the use of the Bonferroni correction for multiple comparisons. Although the authors mention that after applying the Bonferroni correction, the statistical significances remains. Good scientific practice dictates that Bonferroni corrections should have been used in the results section.
- The diseases identified as “statistically significant” are also highly correlated with confounding factors such as age, professional-exposure and life-style. In the paper there is no indication that appropriate corrections with respect to confounding factors have been carried out in their statistical analysis.
- The authors classify results with “p< 5%” as “significant”, while results with “p<1%” is considered as “highly significant”. However, this terminology is meaningless. A statistical test provides either a statistically significant result or not. There is no measure on more or less “statistically significant”. A lower p-value only indicates a lower change on obtaining a false-positive result but does not mean a stronger significance.
- No distinction has been made regarding the type of diseases. Although mentioned in the discussion, this distinction is highly relevant considering the research goals of their paper and importance of their conclusions.
- Also, the authors have not clarified:
  - that it has been verified that patients from group A, B and C attend the same hospital as patients from group D.
  - that the determination of exposure levels haven been conducted blindly with respect to from the collection of disease-data in order to avoid influencing the statistical analysis outcome.

Finally it is mentioned that the paper contains various careless mistakes which deteriorate the clarity of the paper. The content of Table 3 and Table 4 is identical. Table 6 presents a statistically significant result with p=0.142% but indicates this as “not (statistically) significant”. The confidence intervals of Table 5 and Table 6 are equal while the Odds Ratios are different. The latter is an unlikely statistical result and more probably a “copy and paste” error.

Conclusion

The published Odds Ratio of 1.43 (Table 3) which is, from an epidemiological point of view, considered as a high value. This might be an alarming result. However, the research published contains various significant methodological errors in such a way the conclusions formulated in the paper are scientifically very disputable.
My suggestion to the authors would be the following: in addition to apply Bonferroni-correction, a major omission the authors may want to resolve is to re-analyse their data while applying appropriate corrections for confounding factors as discussed previously. If, and only if, these corrections are applied and the statistical significances remain, the results may express scientific relevance and could yield to follow-up scientific research.

In conclusion, the published study in its current form is of insufficient scientific quality to consider the reported associations between the military radar and the diseases cancer and heart attacks and strokes as plausible causal relations.

References

[1] M. Brizzi and F. Marinelli, “Increased risk of cancer and heart diseases due to the exposure to the radar EMF among the population of Potenza Picena, Italy (1986-91)”, Eur. J. Oncol.; Vol 23, No. 4, pp204-210, 2018.